AUSTRALIAN RAIL TRACK CORPORATION LTD

Discipline: Engineering (Track & Civil) **Category: Standard**

Control Surveys

ETD-00-04

Applicability

New South Wales	✓	**CRIA (NSW CRN)**	

Primary Source

ARTC NSW Standards TEP 21, TEP 22, TEP 23, TEP 27 and EYP 04

Document Status

Version	Date Reviewed	Prepared by	Reviewed by	Endorsed	Approved
1.1	18 Jun 10	Standards	Manager Standards	Exec Manager SS&P 21/06/2010	CEO

Amendment Record

Version	Date Reviewed	Clause	Description of Amendment
1.0	01 Dec 09		Implementation draft. Supersedes NSW Standards TEP 21 v1.2, TEP 22 v1.3, TEP 23 v1.3, TEP 27 v1.2 and EYP 04 v1.2
1.1	18 Jun 10		Banner added regarding mandatory requirements in other documents and alternative interpretations.

Contents

Mandatory requirements also exist in other documents.

Where alternative interpretations occur, the Manager Standards shall be informed so the ambiguity can be removed. Pending removal of the ambiguity the interpretation with the safest outcome shall be adopted.

1 General

Railway surveys are essential for the correct design, installation and maintenance of railway infrastructure. Control surveys form the framework for most railway surveys.

This specification outlines;

- the control survey standards and policies;
- the types of control surveys;
- the co-ordinate systems used;
- legislative obligations;
- field procedures; and
- documentation procedures.

2 Background

The original track alignments were set out using angles and distances. They were permanently marked using monuments in the 6 foot. Re-establishment of the alignment depended on finding the original monuments.

Due to the loss or inaccessibility of many of the monuments, track alignments were co-ordinated using control surveys to connect the alignment to the Integrated Survey Grid (ISG) for New South Wales. ISG was defined on the ground by permanent control marks initially placed around the State by the Lands Department. The Lands Department has been contracted to place these marks on several rail corridors (see Appendix 1). For rail survey purposes these corridors were called ISG areas.

All other co-ordinated locations outside the ISG area were nominated as Railway Integrated Grid (RIG) areas.

ISG co-ordination of track alignments offers the advantages that;

- the re-establishment of the track alignment does not rely on marks within the railway corridor.
- the track alignment can be related to outside civil works based on ISG.
- the track position can be determined by Global Positioning Systems (GPS).

There is a new coordinate system being adopted across Australia called Map Grid of Australia (MGA) based on a new model or datum for the shape of Australia called GDA94 or Geocentric Datum of Australia. GDA94 is based on GPS measurements taken in 1994. GDA is part of a global coordinate reference frame and is directly compatible with the Global Positioning System (GPS). There is a transition period of several years where the Lands Department will be providing both types of coordinates.

3 Control Surveys

3.1 Policies and Strategies

Control surveys should be progressively extended into all Class A, B and C Class lines. This is to allow the co-ordination of track alignment.

Priority should be given to areas of multiple track, curved track, railway yards and areas containing major structure renewals.

All surveys in the above area that require 3 or more control marks shall be based on ISG and AHD, unless otherwise directed.

On greenfield sites, or on large projects, with no existing coordinates, consideration should be given to the adoption of the MGA system if there are long term benefits and the size of the job warrants it.

The existing coordinate system (usually ISG) is to continue to be used unless there is a reason to do otherwise.

All control marks should be positioned where possible with a clear window to the sky to allow the future use of GPS.

Access to all control marks on railway property is restricted. External parties wishing to use control marks on Australian Rail Track Corporation property are to provide the necessary Indemnity Forms and work in accordance appropriate safeworking requirements. (Refer to Surveyor general's Directions No. 7).

In order to allow authorised access to Permanent Marks and State Survey Marks (PMs and SSMs), these marks should only be placed:

- in public access areas (eg. on platforms), or
- in 'off-track' areas as defined by safeworking requirements
- where access to the mark does not require the public to enter 'on-track' areas.

Where this cannot be achieved Railway Permanent Marks (RPMs) are to be used. Access to these marks requires authorisation and supervision as per above.

3.2 Legislative Obligations

All control surveys should be conducted in accordance with the provisions of the Surveying Act 2002, the Surveying Regulation 2001 and the Inter-Governmental Committee on Surveying and Mapping Standards and Practices for Control Surveys (SP1). Where applicable the Surveyor General's Directions must be complied with.

3.3 Types of Control Survey

3.3.1 Major Control

The major control survey forms the framework for the minor control survey. The major control is established more accurately to prevent the propagation of errors through the minor control. It is generally established for surveys greater than 2 kilometres in length or when a project requires high accuracy. It is not usually established solely for detail surveys or for radiating trackwork.

The order of accuracy is to Class C, Appendix B Surveyor General's Directions No 4, using the Survey Control Information Management System (SCIM). The accuracy classification depends on the accuracy of the marks adopted.

The interval between major control marks along the rail corridor is usually greater than 500m. These marks are usually in 'off-track' areas. They usually comprise of PMs and SSMs, but RPMs may be used.

3.3.2 Minor Control

Minor control surveys infill the major control survey to a lower standard. They are used to increase the density of control survey marks near the track so that it can be radiated. A minor control survey may also be used for small detail surveys.

The interval between minor control marks is usually less than 200m so as to keep radiation lengths less than 100m. These marks are usually in 'on-track' areas and usually comprise of RPMs.

3.4 Co-ordinate Systems

3.4.1 Integrated Survey Grid

For all areas (except where MGA has been adopted in accordance with Section 3.1) Australian Rail Track Corporation adopts the ISG co-ordinate projection system as outlined in the 'Manual of the New South Wales Integrated Survey Grid' 1976.

The control mark ISG co-ordinate values no longer have to be held fixed but may be adjusted or updated as approved.

The horizontal and vertical accuracy of the co-ordinates is indicated by an accuracy classification number similar to that obtained from the Survey Control Information Management System (SCIMS). (Refer to Surveyor General's Directions No 4 Using the Survey Control management System (SCIMS)).

Because co-ordinate and height values can be updated, their source and adopted values must be checked to ensure a known reference datum before use. If values have been changed a similarity transformation may be required to convert between datums.

3.4.2 Railway Integrated Grid

In former RIG areas the ISG projection system was adopted but co-ordinate values were expanded as follows:

$$ERIG = E_{ISG} + 500\,000$$

$$NRIG = N_{ISG} + 2\,000\,000$$

The RIG co-ordinate origin was determined in the following priority;

a) from two existing ISG control marks (accuracy generally unknown) or

b) from topographic maps.

Bearings were orientated to Grid North when possible.

All measured distances were adjusted by a combined scale factor, calculated using the approximate ISG co-ordinates and the approximate AHD level obtained from topographic maps or other sources.

The control mark co-ordinate values in previously designated RIG areas of the rail network will no longer be expanded.

3.5 Field Specification for Control Surveys

3.5.1 Instruments and Equipment

Instruments and Equipment must conform to the requirements specified in section 3.2.

3.5.2 Major Control Surveys

Major Control Surveys must conform to the requirements of specifies in section 3.2.

The major control network should be integrated into the State framework whenever possible unless otherwise directed. This integration is particularly significant at the endpoints and at the midpoint of the traverse, as these points are important in reducing the propagation of errors.

3.5.3 Minor Control Surveys

All minor control marks shall be fixed by a closed traverse.

The minor control traverse should incorporate all major control marks along the railway corridor for the length of the traverse.

3.5.4 Field Notes

Field notes are to comply with the Surveying Regulation 2001.

3.5.5 Sketch Plans

Sketch plans are to conform to Surveyor General's Directions No. 2 Preparation of Locality Sketch Plans.

Each Railway Permanent Mark (RPM) requires a Survey Mark Sketch Plan to be submitted to ARTC. The above sketches should contain:

a) Kilometrage;

b) Offset from near rail;

c) At least three connections with bearings and distances; and/or

d) Perpendicular offsets to nearby features.

The Survey Mark Sketch Plan is to provide adequate site measurements for subsequent field location of the mark.

3.5.6 Control Survey Marking

3.5.6.1 Type of Marks

Marks for control surveys are to be of the types defined in Table 1 Groups (1), (2) and (4).

3.5.6.2 Recovery Points

Marks for recovery points to the control survey marks are to be of the types defined in Table 1 Group (6).

3.5.7 New Construction Survey marking

3.5.7.1 Location & Type of Marks

Pegs and profiles to define alignment and grade to be placed as listed in Table 1 Group (6).

Recovery marks of the types defined in Table 1 Groups (3) or (6) are to be place generally in pairs:

- At each tangent point at right angles to the straight and remote from proposed cuttings, embankments or other earthworks;
- Radially at principal points and at no greater interval than 200m on circular arcs;
- At no greater interval than 500m on straights

3.5.7.2 Indicators

Indicators as defined in Table 1 Group (7) are to be placed at all pegs except in station or goods yards, where adjacent rails may be marked with paint in lieu.

3.5.8 Survey marking on Existing Lines

Marks placed are to be the same as for new construction with the exception that marks Table 1 Group (5) are to be retained where possible. Where a control survey exists, or on lines where stringlining surveys have been carried out, marking of recovery points need not be undertaken.

3.5.9 Preservation of Survey Marks

The attention of all personnel is drawn to the necessity of preserving all survey marks. Persons destroying, removing or disturbing survey marks are liable to pay heavy fines imposed by the various Acts of Parliament.

3.5.10 Documentation Procedures

3.5.10.1 Major and Minor Control

Major and minor control survey marks shall be documented in accordance with Lands Department requirements with regard to locality sketches and network diagrams for Permanent Marks (PMs) and State Survey Marks (SSMs). PMs and SSMs require a separate Lands Department Locality Sketch Plan to be submitted to the Surveyor General.

For control marks other than those above, a standard 'ARTC Survey Mark Sketch Plan' is required (See Appendix 2 for definition of terms).

The horizontal and vertical accuracy of the co-ordinates is to be shown by an accuracy classification number similar to that obtained from the Survey Control Information Management System (SCIMS).

A network diagram based on a railway curve diagram or topographic map with the control marks roughly plotted is required for each survey. (See example in Appendix 3).

3.5.10.2 Final Documentation

Final control survey documentation shall be on A4 paper and must contain:

- A cover sheet;
- Locality Sketch Plans or Survey Mark Sketch Plans;
- A network diagram;
- A tabulation showing:
  - Mark number;
  - Co-ordinates;
  - Reduced level;
  - Mark type;
  - Kilometrage;
  - Offset to near rail.

3.5.11 Registration and Storage of Information

All control survey documentation, including Locality Sketch Plans and Survey Mark Sketch Plans, shall be registered by each contracting organisation and be made available through ARTC.

3.5.12 Control Mark Register

ARTC should have a Control Mark Register containing the following relevant data:

- Mark numberand type;
- Line and Locality;
- Kilometrage;
- Offset to near rail;
- Co-ordinates (E,N,RL);
- Accuracy (H&V);
- Adjustment number or file;
- Zone;
- Field sheet reference number;
- Access restriction status.

4 Use of Survey Control Marks by External Bodies

Any request for authorisation to occupy or to observe survey control marks on ARTC property should be referred to ARTC.

If a survey control mark is 3 metres or more away from the nearest rail, and access to the mark is available without having to cross any railway track, authority may be given to the survey party providing: -

- the authorising officer has instructed the party on how to minimise the risk to persons whilst on ARTC property,
- each person is issued with a safety vest to be worn whilst on any ARTC corridor,
- an assurance, in writing, is given by each person that neither they nor any part of their equipment or vehicles will come closer than 3.0m from the nearest rail.
- each person has signed an indemnity form and delivered it to the authorising officer.
- the authorising officer has informed the party of the safeworking procedures that apply where work is to be carried out in the vicinity of electrical wiring or equipment, including the following points;
    - steel tapes, metal reinforced measuring tapes, long steel rules or similar equipment must not be used,
    - safe areas and live areas are to be pointed out, and any restrictions which apply must be explained.

If a survey control mark is within 3 metres of the nearest rail, and/or access to the mark involves crossing any railway track, then authority may only be given when protection can be provided in accordance with approved safeworking procedures.

5 Table 1 – Description and Use of Marks

GROUP	APPLICATION	LOCATION	HORI-ZONTAL	VERTI-CAL	DESCRIPTION	TYPE	REFERENCE	REMARKS
1	Control surveys	Every 500 metres and at other nominated locations.	Yes	Yes	Covered with cast iron box.	PM	Fig 1	Marks supplied by Dept. of lands.
					At ground level or covered with cast iron box.	SSM	Fig 2	Marks supplied by Dept. of lands.
2	Minor control surveys for construction and track maintenance	Along the permanent way.	Yes	Yes	Punch mark in galvanised iron star picket set in concrete at ground level or covered with cast iron box.	-	Fig 3	In soil or firm ground.
			Yes	Yes	Long brass pin and triangle cast in concrete covered with cast iron box.	PTCSM	Fig 4	In soil or firm ground.
			Yes	Yes	Long brass pin and triangle. Short brass pin and triangle.	PTSCM	Fig 5	In bed rock, concrete, stone or masonry.
			Yes	Yes	Ramset or Hilti Nail		-	On overhead wiring mast.
3	Recovery points	To reference control and minor control marks and recover tangent points, circular curves and long straights	Yes	No	Brass tack in lead plug.	-	-	In concrete, rock or masonry.
			Yes	No	Drill hole and wings.	-	-	In concrete, rock or masonry.
			Yes	Yes	Solid steel rod, 100 to 200mm long.	-	-	In concrete, rock or masonry.
			Yes	Yes	Ramset or Hilti Nail.	-	-	On overhead wiring and other structures.

Table 1 – Description and Use of Marks

GROUP	APPLICATION	LOCATION	HORI-ZONTAL	VERTI-CAL	DESCRIPTION	TYPE	REFERENCE	REMARKS
4	Bench mark	Nearest suitable	No	Yes	Survey Control Station	-	-	As per Group 1 & 2
5	Alignment & grade control for maintenance requirements.	Centreline of six foot for multiple tracks, recovery marking, offsets for single lines.	Yes	Yes	Existing maintenance marks.	Monuments plaques	Plan Nos ST 31 ST 32 ST 226	Existing marks retained.
6	Setting out and recovery of track structures.	Every 20m adjacent to centreline 6 foot	No	Yes	Pipes profile			
		Track centreline Turnouts and Structures	Yes	No	Pegs - Setting out	R,S,W,X	Fig 6	
		Offset TCM (track control marks) These marks refer to the alignment of the line rail. Circular curves radius 400 and less and transition curve----------every 10m. Other circular curves and straights--------every 20m. Recovery marking as required. Placed at ground level	Yes	No	Pipes TCM	Pipe		400mm (min) 15mm ID 21mm OD Medium GIP Placed at ground level in firm ground. 800mm (min) 15mm ID 21mm OD Medium GIP or Aluminium picket Placed at ground level in ballast or ash bank.
7	Indicate locations of survey marks.	Adjacent to survey mark for Turnouts and Structures	No	No	Indicators, hardwood.	TV	Fig 6	-
		Adjacent to Survey mark 300mm behind mark	No	No	Aluminium Survey Picket & Cap	-	Fig 9 Fig 8	-1650mm

6 Drawings

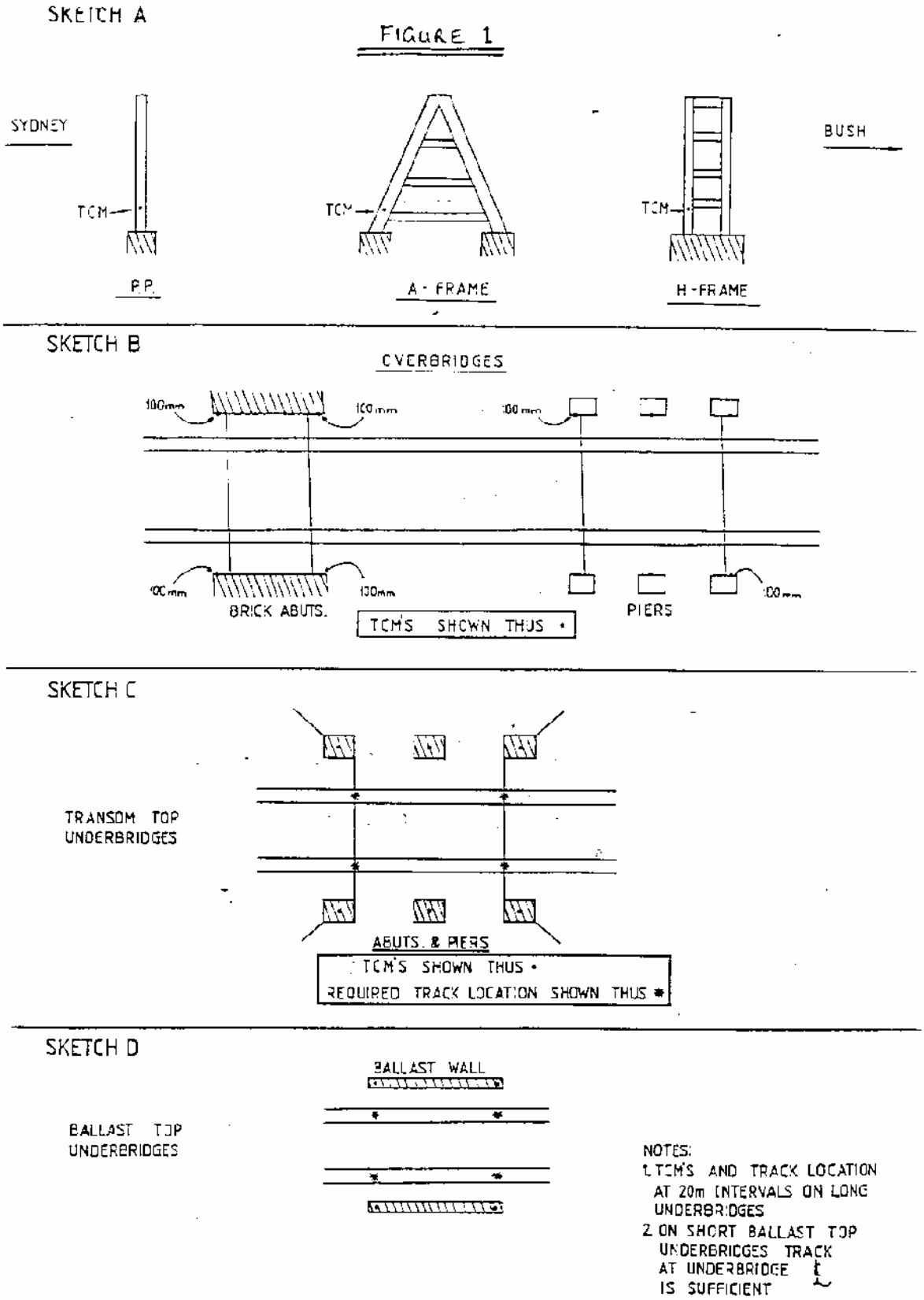
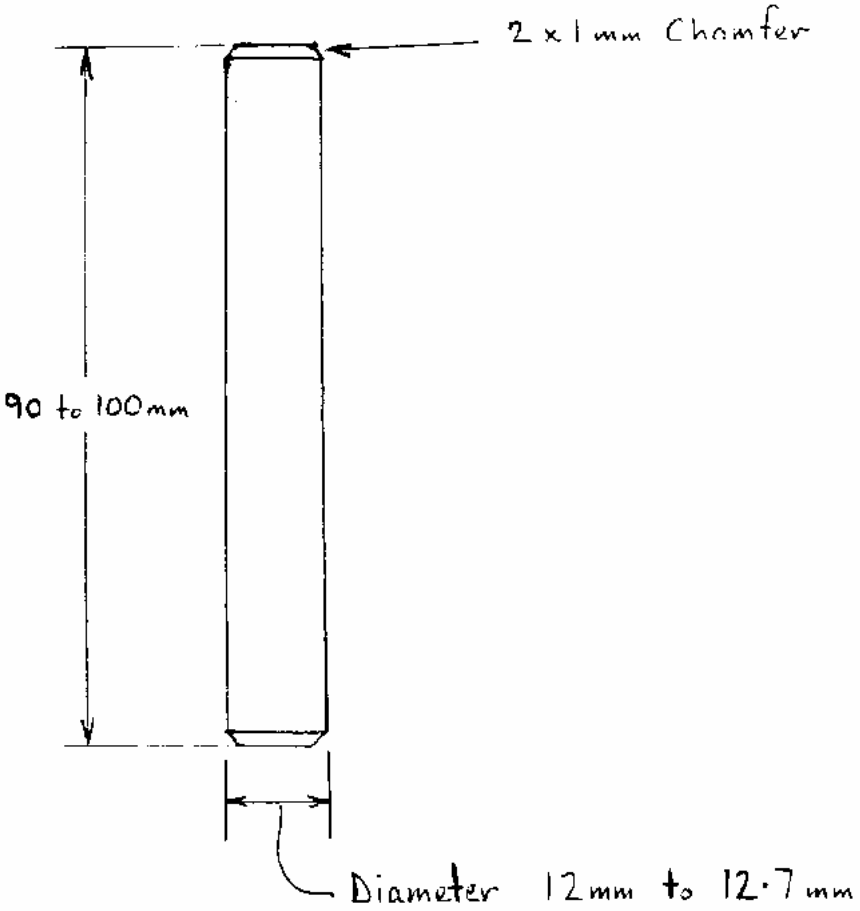
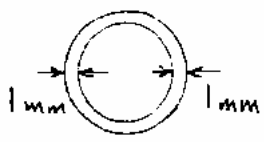

SKETCH A
FIGURE 1
SYDNEY
BUSH
TCM
TCM
TCM
P.P.
A - FRAME
H - FRAME
SKETCH B
OVERBRIDGES
100mm
100mm
100mm
100mm
100mm
100mm
BRICK ABUTS.
PIERS
TCM'S SHOWN THUS •
SKETCH C
TRANSOM TOP
UNDERBRIDGES
ABUTS. & PIERS
TCM'S SHOWN THUS •
REQUIRED TRACK LOCATION SHOWN THUS *
SKETCH D
BALLAST WALL
BALLAST TOP
UNDERBRIDGES
NOTES:
1. TCM'S AND TRACK LOCATION AT 20m INTERVALS ON LONG UNDERBRIDGES
2. ON SHORT BALLAST TOP UNDERBRIDGES TRACK AT UNDERBRIDGE IS SUFFICIENT

FIGURE 2

BRASS PIN TYPE 3
(Brass Rod)





Figures 3 to 5

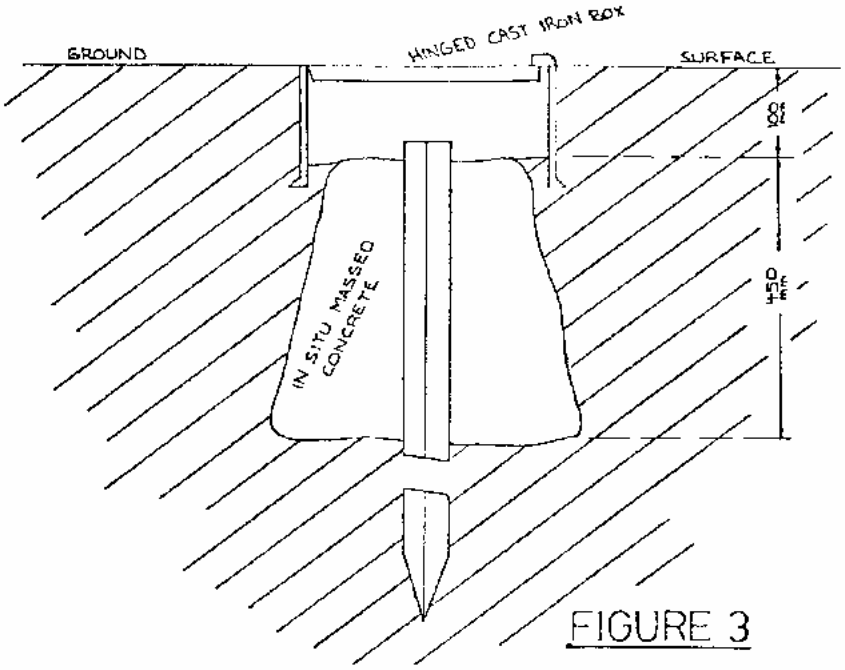


FIGURE 3

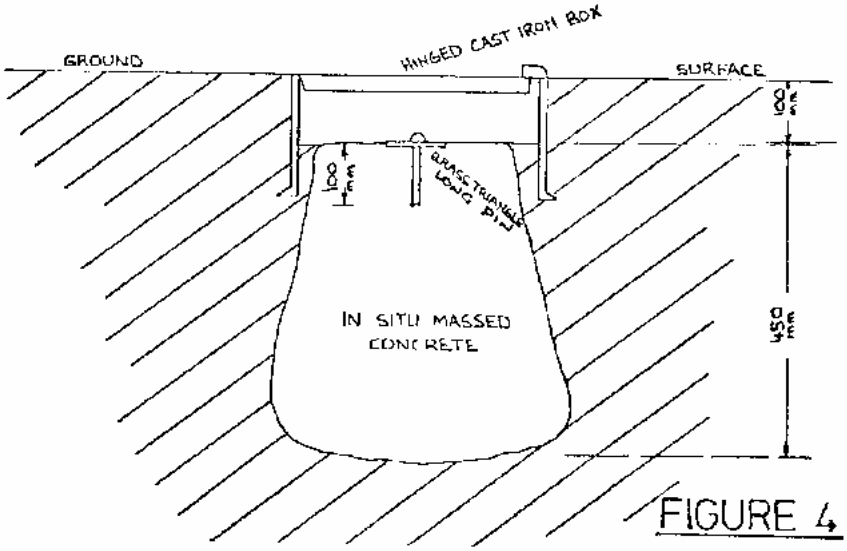
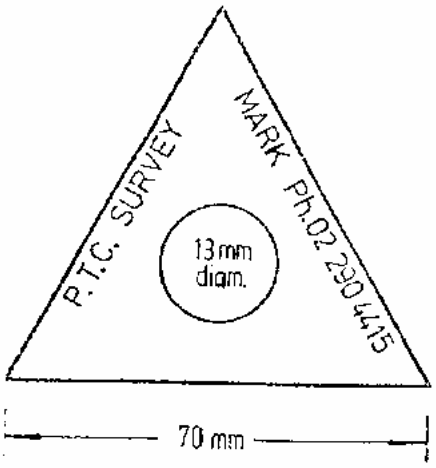


FIGURE 4



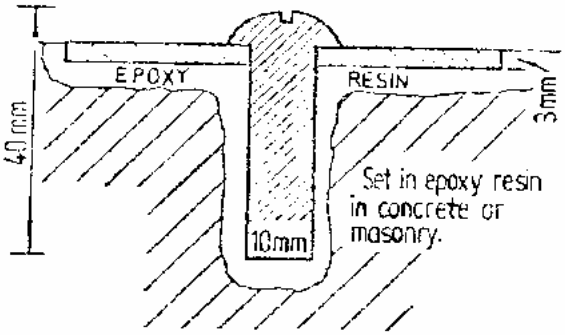
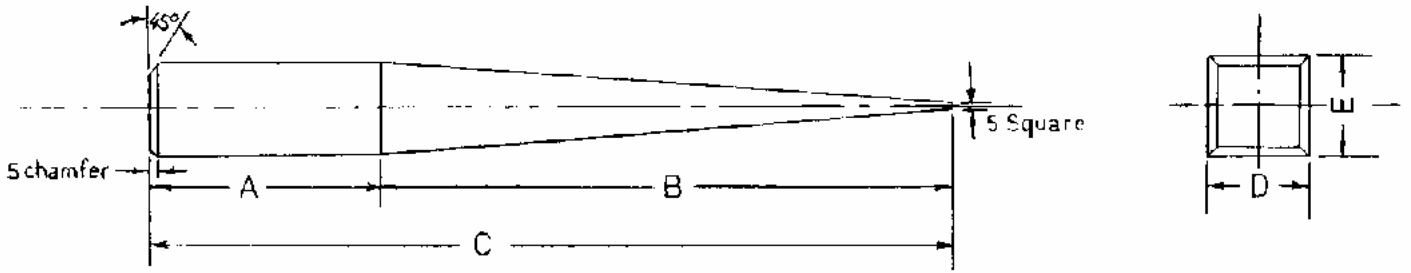


FIGURE 5

SURVEYORS' PEGS

FIGURE 6



DIMENSIONS (mm)

DESCRIPTION	SYMBOL	A	B	C	D	E	REMARKS
Land Survey Peg	P	150	450	600	80	80	Painted white
Tally Board	Q	180	200	380	25	150	" "
Survey Peg	R	50	250	300	50	50	Unpainted
Tally Peg	S	50	250	300	80	80	"
Profile Peg	T	1000	100	1100	40	40	"
Indicator Peg	V	230	230	460	50	25	"
Chain Peg	W	50	180	230	40	40	"
Survey Peg	X	50	250	300	80	50	"
Land Survey Peg	Z	100	300	400	80	40	Painted White
String Lining	N	50	250	300	50	25	Unpainted

Note: All dimensions millimetres.
All pegs to be made of hardwood.

Extracted from Workshop Data Sheets

FIGURE 7

STAINLESS STEEL PIN

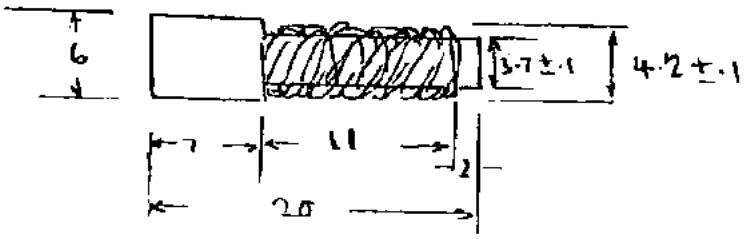


FIGURE 8

SURVEY PICKET & CAP

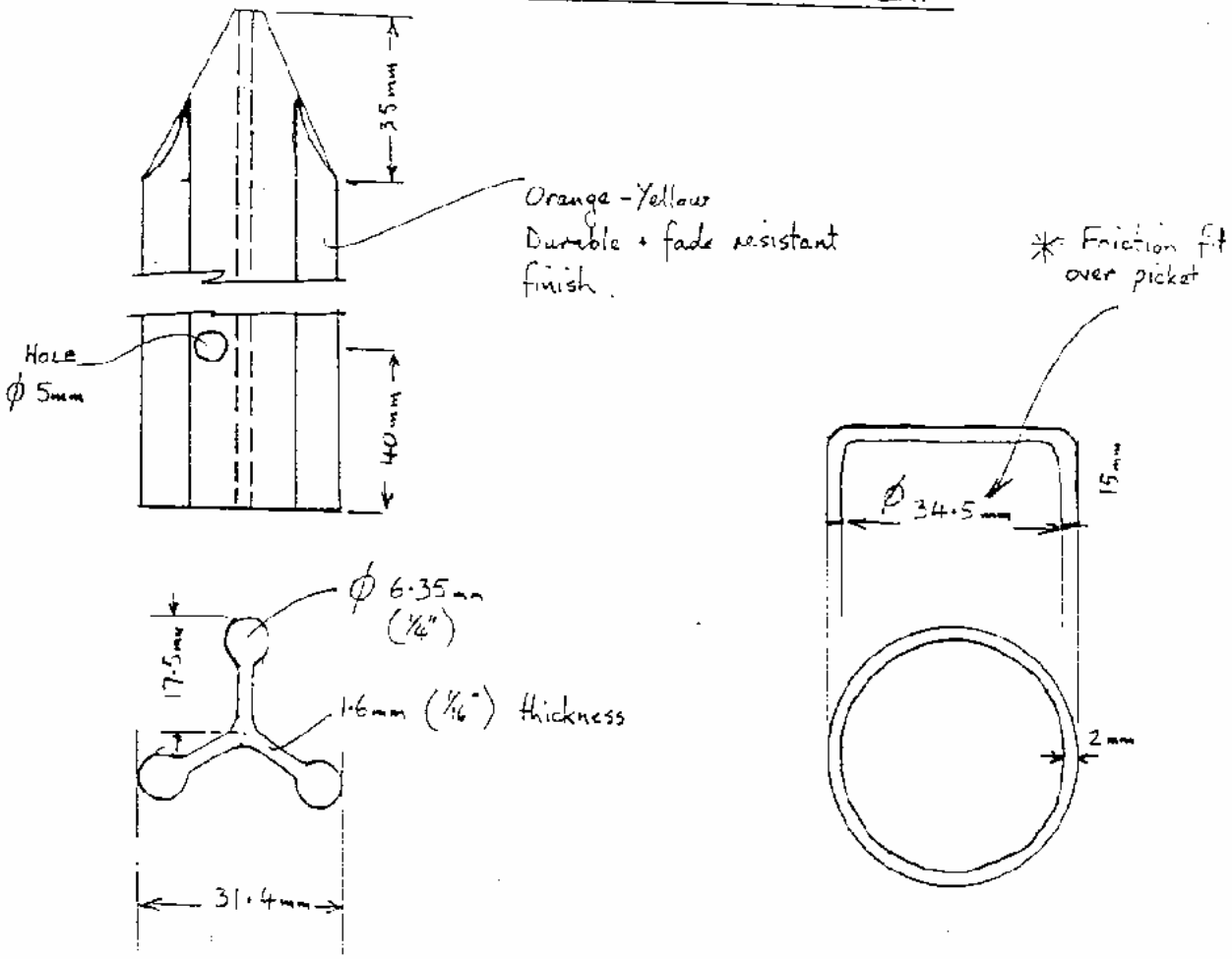
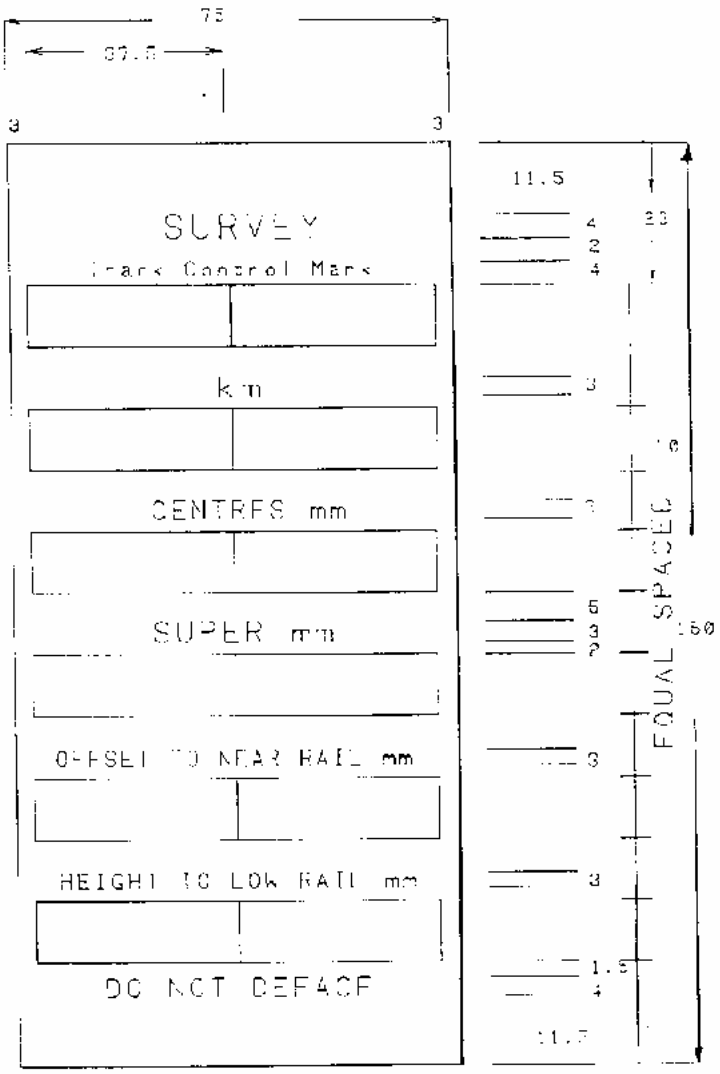


FIGURE 9 ALUMINIUM PLAQUE



* All dimensions are in mm

LETTERING HEIGHT : LETTERING DEPTH : Ø.4mm

4mm Top, Bottom Headings
3mm Elsewhere
Lower Case - 75% Upper Case

LINE THICKNESS : 0.6mm LINE DEPTH : Ø.4mm

HEIGHT : THICKNESS 5:1

STYLE : GOTHIC

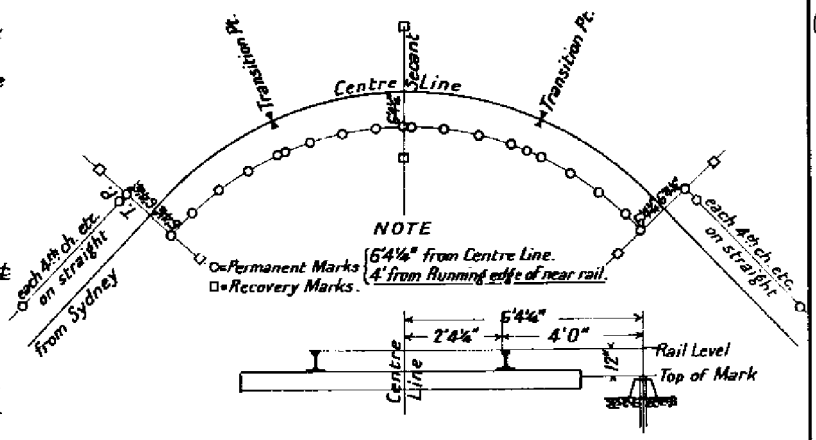
MATERIAL: MARINE GRADE ALUMINUM 5251 H34 ANODISED 20 MICRON

(209)

Positions of Permanent Marks

Permanent Marks shall be placed 6ft.4¼ins from Centre Line with Top of Mark 12 ins. below Rail Level (Low Rail) and opposite the following points:

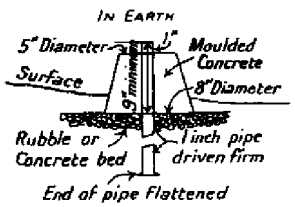
(1)	Each Tangent Point	on all Curves	Two Marks: one on each side of Centre Line
(2)	" Secant "	" " "	One mark on inside of Curve
(3)	" Transition "	" " "	" " " " " "
(4)	" Chain	Curves of Rad. exceeding 20 ch.	" " " " " "
(5)	" Half Chain	" " " 20 ch. and less.	" " " " " "
(6)	" Fourth Chain	Straights	" " Down side of Centre Line
(7)	" Change of Grade	" "	" " " " " " "
(8)	" Chain on Vertical Curves	"	" " " " " " " "
(9)	" Abutment of any Opening (within 5 links of face)		" " inside of Curve or Down side of ℄



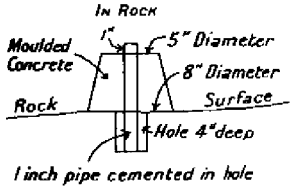
Positions of Recovery Marks

Recovery Marks in addition shall be placed opposite each Tangent Point and Secant Point, one on each side of and if possible equidistant from Centre Line, the distance being at Surveyor's discretion and preferably within Railway boundary. A record of their positions shall be kept in a Curve Book.

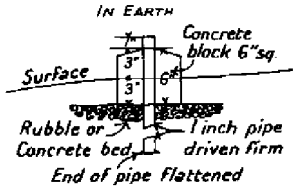
Details of Permanent Marks



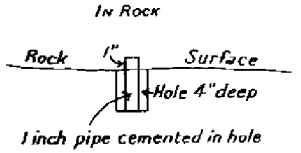
A Permanent Mark shall be a 2in. nail set in cement in a 1in. Galvanised Water Pipe flush with top. The pipe shall be (1) driven until it becomes firm or (2) cemented in rock to a depth of about 4 ins. and cut off at the specified Level (12 ins. below Rail Level). A concrete block of 5ins. diameter at top and 8ins. diameter at base shall be moulded round the pipe to leave 1 in. of pipe projecting. The concrete block shall be bedded (1) on Rubble or Concrete at a minimum depth of 9 ins. below top of pipe or (2) on Rock Surface. The pipe shall be filled with cement in which the nail is set.



Details of Recovery Marks



A Recovery Mark shall also be a 2in. nail set in cement in a 1in. Galvanised Water Pipe. The pipe shall be driven firm or cemented into rock as above. In the latter case the pipe shall be cut off 1 in. above rock surface. In the former case the pipe shall be cut off 4 ins. above ground surface, a concrete block 6ins. square of depth 6 ins. shall be moulded round pipe to leave 1 in. of pipe projecting and shall be bedded on Rubble or Concrete.



Marks on Structures

Marks shall be made on the Centre Line of Railway on Structures such as
(1) Underbridges, on all piers and abutments not covered by ballast and where possible at every ¼ chain.
(2) Overbridges, at each face and where necessary at the centre of the bridge.
The marks shall be of a permanent nature suitable to the structural material.
Where pipes are used on the Centre Line the top of the pipe shall be 4 ins. below Rail Level.
Marks shall be made at Rail Levels (High and Low) on the faces of platforms at each end and opposite each chain (or half chain on curves of Radius 15 chains and less).
The offset from each mark to the running edge of the near rail shall be indicated thus: 3'6" 3'6"

N. S. W. R.

PERMANENT MARKING OF TRACKS

Diagram showing Positions & Details of Permanent Marks & Recovery Marks

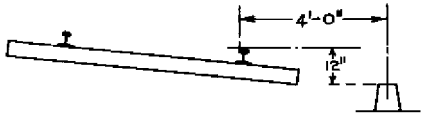
Chief Civil Engineer. S.T. 31

(219)

POSITION OF MARKS

SINGLE LINES Where no platforms or structures exist.

Marks to be placed on the inside of curves or on the down side of straights at 4'-0" from gauge and 12" below level of low rail.



DOUBLE LINES Where no platforms or structures exist.

Marks to be placed in the centre of the six-foot at 12" below level of low rail.

SINGLE OR DOUBLE LINES At Platforms and Retaining Walls.

Marks to be on face of wall at level of low rail (or 12" above) at each end and at each chain along wall.

SINGLE OR DOUBLE LINES At Bridge Piers and Girders.

Marks to be on face of pier or girder at each end and at centre where necessary at level of low rail (or 12" above)

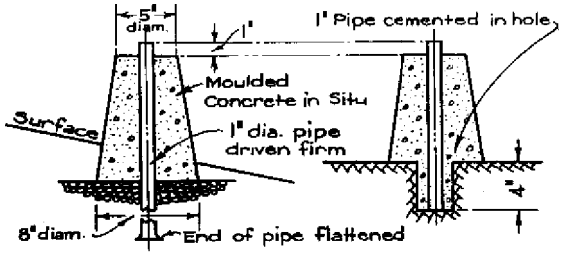
SINGLE OR DOUBLE LINES Poles and Overhead Wiring Structures.

Marks to be on face of pole or structure at level of low rail (or 12" above)

DETAIL OF MARKS

Where permanent concrete track centering marks exist at the locations to be marked the superelevation is to be painted on these.

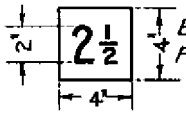
Where no permanent marks exist at the required locations, permanent concrete marks as shown are to be provided and superelevation painted on.



IN EARTH IN ROCK

Where platforms or other structures exist within 12'-0" of centre line of track the superelevation is to be painted on in position as indicated under "Position of Marks."

Superelevation is to be shown on all masts and structures as follows.



Background 4" square painted Black
Figures 2" high stencilled in White.

All marks to be painted on side facing rail.

LOCATIONS TO BE MARKED

The locations where superelevation is to be marked on Curves are as follow.

1 Point of commencement of superelevation

2 Point where full superelevation is obtained

3 Point where change of superelevation occurs

4 Centres of curves over 10 chains in length

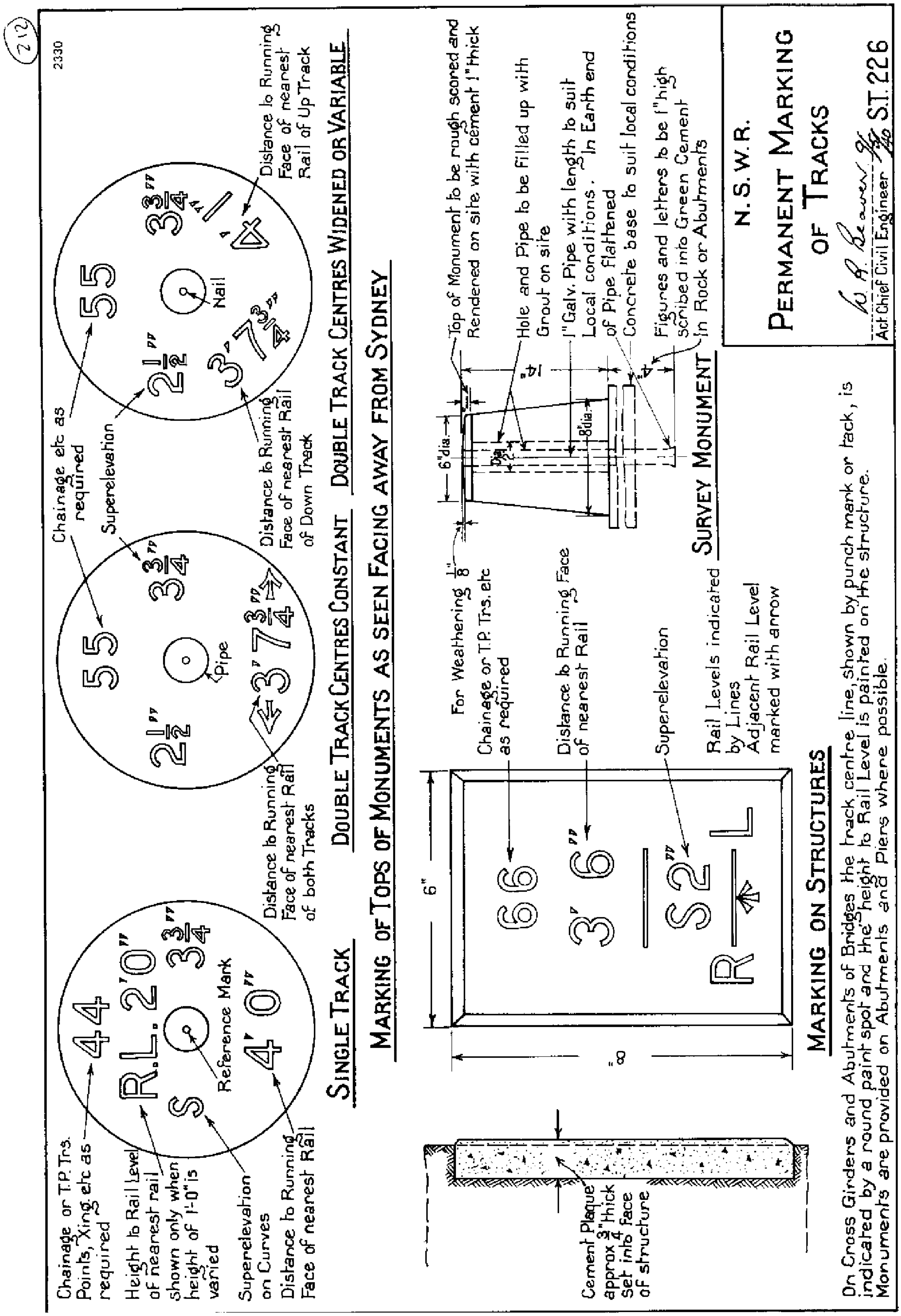
For instructions and method of applying superelevation see Drawings Nos ST. 33 & 33A.

Department of Railways. N.S.W.
Way & Works Branch.

PERMANENT MARKING OF TRACKS
Marking of Superelevation on Curves.

Chief Civil Engineer

ST. 32


2330
N.S.W.R.
PERMANENT MARKING OF TRACKS
Act Chief Civil Engineer
ST. 226
MARKING OF TOPS OF MONUMENTS AS SEEN FACING AWAY FROM SYDNEY
SINGLE TRACK
DOUBLE TRACK CENTRES CONSTANT
DOUBLE TRACK CENTRES WIDENED OR VARIABLE
Chainage or T.P. Trs. Points, Xing etc as required
Height to Rail Level of nearest rail shown only when height of 1'-0" is varied
Superelevation on Curves
Distance to Running Face of nearest Rail
Reference Mark
Distance to Running Face of nearest Rail of both Tracks
Chainage etc as required
Superelevation
Pipe
Nail
Distance to Running Face of nearest Rail of Down Track
Distance to Running Face of nearest Rail of Up Track
SURVEY MONUMENT
Top of Monument to be rough scored and Rendered on site with cement 1" thick
Hole and Pipe to be filled up with Grout on site
1" Galv. Pipe with length to suit Local conditions. In Earth end of Pipe flattened
Concrete base to suit local conditions
Figures and letters to be 1" high scribed into Green Cement In Rock or Abutments
For Weathering
MARKING ON STRUCTURES
Chainage or T.P. Trs. etc as required
Distance to Running Face of nearest Rail
Superelevation
Rail Levels indicated by Lines Adjacent Rail Level marked with arrow
Cement Plaque approx 4" thick Set into face of structure
On Cross Girders and Abutments of Bridges the track centre line, shown by punch mark or tack, is indicated by a round paint spot and the height to Rail Level is painted on the structure. Monuments are provided on Abutments and Piers where possible.

7 Appendix 1 - ISG Network Diagram

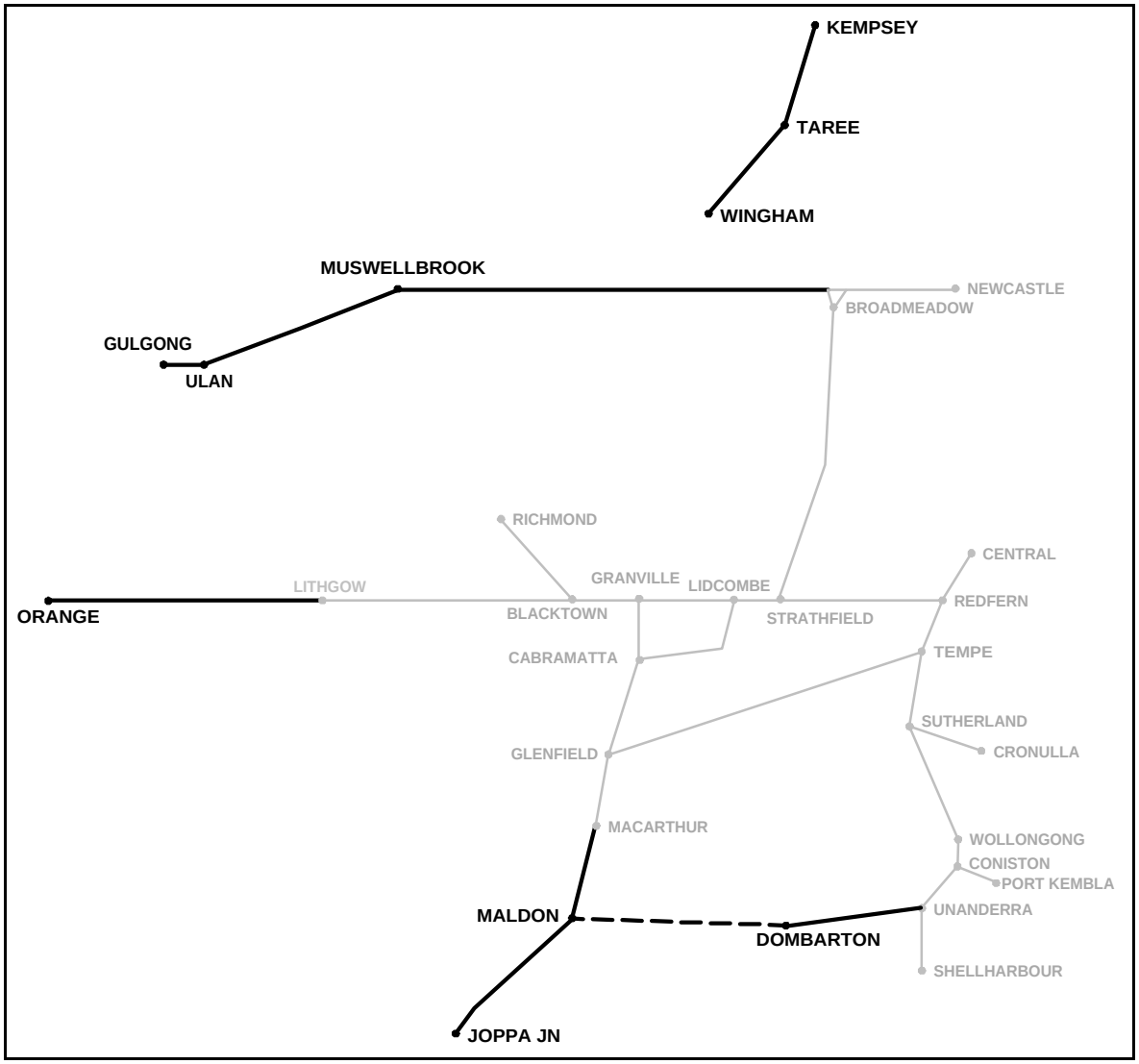


Figure 1 - ISG Network Diagram

8 Appendix 2 - RPM sketch plan – definition of terms & abbreviations

RPM No.	Railway Permanent Mark No.
Line	Railway line name
Locality	Nearest locality name
Km	Kilometrage from Sydney
Location	With your back to Sydney, down side is on your left, up side is on you right
O/S to centreline	Offset to centreline of nearest track
Type of Mark	Type of mark e.g. Brass triangle (BT) in concrete, concrete block
Co-ordinates	Easting, Northing and Reduced Level (RL)
Accuracy	Refer to Surveyor General's Directions No 4 Using the Survey Control Information Management System (SCIMS)
System	Co-ordinate system e.g. ISG
Zone	Grid Zone
Datum	Datum for levels e.g. AHD
Marks Adopted	Details of marks adopted to derive new co-ordinates
Source	Information source for co-ordinates of marks adopted
Adj No	Adjustment Number or File name
Fixed By	Method used to fix the control mark
Access	Restricted if the mark is not in a public access area and is in an 'on-track' area (i.e. within 3 metres of any track) or requires crossing an 'on-track' area. Unrestricted if the mark is in an 'off-track' area
Placed in survey	Purpose for the placement of the control
File No	Reference file number
FS No	Field sheet number
Date of Survey	Date of the field survey
Surveyor	Name of the surveyor supervising the field survey
Office/Organisation	Name of the Office and organization
Declaration	To be signed by the supervising surveyor

9 Appendix 3 - Network Diagram